3. *Effects on Vegetation/Forage*

The Malheur National Forest is over 80 percent forested and roughly 70 percent tentatively suitable for timber management. In forested areas, the structure of plant communities are most influenced by timber management activities, especially logging

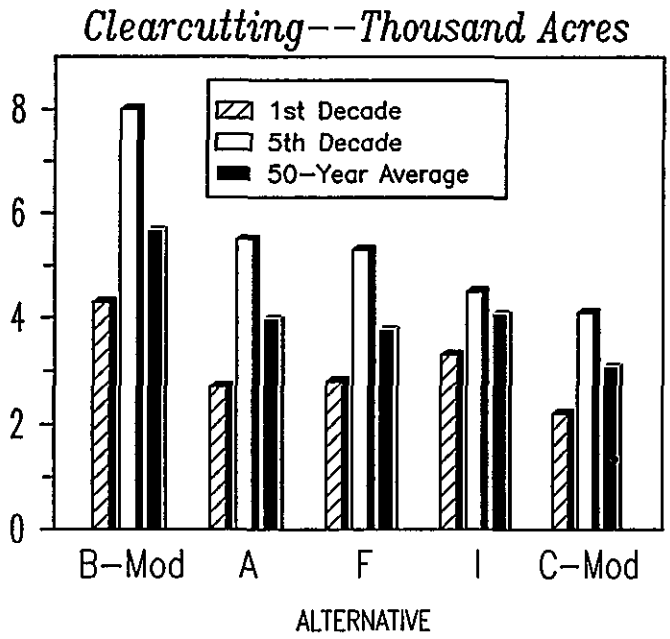
a. *Timber Management Effects on Forage*

The rotation age (how many years trees grow before they are cut), frequency of entry into a stand, amount of timber cut, and silvicultural system all influence other vegetation as well as trees

Alternatives NC, A, B-Modified, F and I emphasize high-intensity timber management on many acres. (See Section 2 of this chapter.) The primary final harvest methods in mixed conifer stands will be clearcuts and shelterwoods These stands are not natural rangeland or forage areas due to the dense tree cover, dominance of huckleberry, and lack of grass and grasslike vegetation. However, timber management activities provide the opportunity to seed disturbed areas with grasses (usually wheatgrasses or orchard grass) and removal of tree cover allows sunlight to reach vegetation on the ground, stimulating growth of shade-intolerant species These results provide transitory range where little to none existed prior to the activity Further entries into the stand (approximately every 20 to 30 years) to complete a precommercial thinning and up to 3 commercial thinnings will provide added opportunities for forage enhancement and continued removal of tree cover.

The highest forage production follows clearcutting Figure IV-6 shows the acres of clearcuts for each alternative for five decades

FIGURE IV-6: *Clearcut Acres Scheduled*



The primary regeneration method used in ponderosa pine is via shelterwood harvest Ponderosa pine sites are naturally the most productive and valuable forested range on the Forest. These sites will also receive entries for stocking level control (thinnings) Timber management activities on these sites provide an opportunity to further enhance the natural productivity on treated areas.

Alternative C-Modified emphasizes open stands of large, mature ponderosa pine (see description of this timber management strategy in Section E2 b of this chapter). Because it takes longer to grow these large trees (stands generally receive only one commercial thinning), these stands are entered fewer times than tree stands receiving high-intensity timber management In addition, no seeding for forage enhancement will be done on timber sale areas in this alternative. Forage response to timber treatments will be limited to naturally occurring vegetation and a small amount of erosion seeding. The tree canopy will remain in place longer, however, such stands are naturally more open and sunny than mixed conifer stands and produce forage vegetation even in these conditions.

In addition, the emphasis in these areas to perpetuate ponderosa pine will result in treatment of the understory This could be done chemically, manually, or with prescribed fire. Either of the latter two methods would reduce competing tree vegetation thus enhancing the grasses and shrubs Fire would produce the most response, actually stimulating grass and grasslike plant growth, particularly of native elk sedge and pinegrass.

There are areas on the Forest which will not be emphasized for pine production in Alternative C-Modified. Clearcutting and shelterwood harvests will often be used to manage mixed conifer stands The natural vegetation will respond to these harvests, which remove the dense tree cover and allow it to flourish (see above)

In each alternative there will be areas on the Forest (wilderness, old growth, undeveloped areas, etc) which receive no vegetative manipulation The vegetation in these areas will move through natural successional stages

b *Range Management Effects on Forage*

Within the Forest, riparian zones are a focal point of cattle grazing activity. Typically, riparian zones comprise 3-5 percent of a pasture, but they generally provide 20-30 percent of the total livestock forage. In a riparian area, when shrub use reaches 50 percent of the annual growth available to wildlife and livestock, livestock use will typically be curtailed

The vigor of shrub species in riparian areas improves over time in all alternatives except Alternative A Heavy utilization of herbaceous vegetation in riparian zones by cattle and anticipated increase in elk herds in Alternative A could cause competition for forage. Riparian areas in winter ranges could show a deteriorating condition caused from grazing, by elk in early spring and by livestock from late spring into fall Shrub growth along streams would slow or be eliminated

In all alternatives except Alternative NC, allowable grazing level on the uplands is targeted at 50 percent of the available forage It is anticipated that, along with the grazing systems and structural improvements, this grazing level will maintain plant vigor and condition, and community diversity

Due to the lack of specific information regarding management activities in Alternative NC, the effects of this alternative cannot be estimated and evaluated to the same degree as other alternatives Based on available information, Alternative NC will also maintain plant vigor and condition The effects on plant community diversity are not known.

Establishment of young grass/grass-like plants in the plant community is expected as the season of use is rotated and overall grazing pressure is maintained at a moderate level After grazing, the forage will generally have a rough, uneven stubbly appearance with scattered seedheads

Forage consumption by cattle tends to be important for short periods during the early part of the grazing season, dropping off rapidly as plants develop Forb use will generally be less than prescribed for grass/grass-like plants, affording that component of the plant community slightly more protection Those forbs in close proximity to grasses, such as

in a meadow or riparian setting, will be managed through the allowable use standards set for grasses

A primary objective of Alternative B-Modified is to increase desirable forage species for livestock A total of 19,000 acres could be treated to enhance livestock forage on flat or gently sloping, nonforested areas within 10 years Higher quality livestock forage can be produced on these sites by introducing a mixture of grass species. Management of livestock will emphasize utilization of the introduced forage Because cattle will prefer and use the introduced grass species, accelerated improvement will occur in native forage species on the untreated areas This improvement will not occur until a significant area has been treated with introduced grass species.

Alternative C-Modified emphasizes reliance on native species for the forage base. Since no timber sale seeding is planned, riparian areas, along with elk sedge and pinegrass, would provide the bulk of available forage Alternative C-Modified improves and maintains the native vegetation through reduced livestock stocking and removal of livestock in those riparian areas in less than desirable condition.

Alternatives F and Iwould create a mix of introduced and native species by seeding approximately 6,000 acres of forest land a year Livestock use would be limited on a site-specific basis to return riparian areas to satisfactory condition The limited livestock use would be staged to occur over a longer period of time, and livestock use would vary from no use to 40 percent use, depending on the rate of recovery desired. This would accelerate recovery of streamside vegetation and maintain shrub and herbage vigor once satisfactory condition is reached

c *Mitigation Measures*

Grazing and browsing remove vegetative material; this curtails the rate of energy production (photosynthesis) Prolonged and excessive forage utilization can result in a reduction of plant vigor, changes in composition of vegetative communities, reduced vegetation density, and decreased biomass production Forest-wide Standards (Forest Plan, Chapter IV, Section E) for management of vegetation using browsing and grazing will be followed on all grazing allotments and include specific objectives for all resources and uses Additional site-specific interdisciplinary objectives will be developed for each allotment to manage use of the vegetation. Combined livestock, wild horse, and big-game use will be limited to a level which assures that vegetative-use objectives are met on every allotment.

Allotment management plans will be prepared and maintained to direct site-specific management actions. Monitoring of these plans for effectiveness and achievement of Forest-wide Standards and specific objectives will be an ongoing program Inventory and analysis of forage trend, production, and condition is an essential part of the monitoring effort Range practices and improvements will be evaluated and modified to improve and mitigate effects of browsing and grazing use

Such range practices may include additional fencing of allotment pastures, development of water sources away from live streams, proper amounts and distribution of salt, riding and herding, livestock forage enhancement, reduced season-of-use, reduced animal numbers, and appropriate grazing systems Local Forest experience and professional judgment have determined that forage mitigation measures can be 70 percent effective if sufficient resources are available to plan, administer, develop, and monitor use If resources are not available the mitigative course of action is to reduce numbers and/or season of grazing and browsing animals (Wambolt 1973)

The Forest manages habitat for big game The State of Oregon manages big-game populations. Big-game numbers are controlled by lengths of hunting season, bag limits, number of hunting permits issued, sex of animals harvested, etc Natural mortality factors such as predation and winter kill, also play a factor in the maintenance of herd

numbers The Forest may recommend population control to the State if animals are overusing the forage.

One mitigation measure the Forest has over big-game animals concerning utilization of forage in riparian zones is creation of exclosure fences which exclude both livestock and big game Examples of vegetative recovery, evaluated on the Forest through professional judgment and experience, show this practice can be 99 percent effective when annual maintenance is performed on the exclosure As with any type of structure, if not maintained, it becomes ineffective over time

4. Effects on Wildlife/Big Game

The general effects of timber harvest and other management activities on wildlife are discussed in Chapter III, Affected Environment

a *Timber Management Effects on Big Game*

Timber management activities have the potential to alter the Forest ecosystem more drastically than any other Forest management activity and, as such, can have a profound effect on the response of deer and elk populations As timber management activities remove overstory trees, the understory vegetation responds and forage production is increased Theoretically, more forage is produced and available to grazing animals as more acres are managed by timber production This transitory forage is available for a few years until the new forest stand develop and reoccupies the site Timber management activities have improved and can further improve the balance and distribution of cover and forage if strategies are well-developed Elk populations have increased over the last 12 years, probably in response to a reduction of excess cover and corresponding increases in forage

However, big-game populations may respond to many factors other than forage production and availability One such factor may be related to reductions in cover beyond threshold levels As much information is anecdotal, and not analytical, many opinions exist concerning big-game habitat and the response of big game to habitat conditions For the purposes of habitat discussions in this FEIS, a Habitat Effectiveness Index (Thomas, et al , 1988) is used to estimate differences in big-game habitat, and potential populations, by alternative design

Population levels are not directly related to the Habitat Effectiveness Index (HEI) for elk because of factors such as hunting mortality and the quality of winter range outside the Forest But, for planning purposes, the assumption is made that potential elk populations are directly proportional to HEI, which is used for alternative comparison Habitat Effectiveness Index is the relationship of habitat factors, cover quality, spacing and size, tied to the miles of open road (disturbance) and available forage These factors interact as a result of management activities, and potential numbers of elk correspondingly increase or decrease. Because of the lack of data, forage factors are assumed to be similar for all alternatives

The Habitat Effectiveness Index model has been designed for habitat analysis in subwatershed areas of 3,000 to 15,000 acres in size For planning purposes and for analysis and comparison of alternatives, the HEI has been used to give a Forest-wide picture of habitat conditions for elk Forest-wide application of the model has masked the more subtle differences between alternatives over the 50 year planning horizon However, generalized differences between alternatives can be addressed and are discussed below

Alternative A, through steady-increasing regeneration harvests, brings a slow improvement in cover size and spacing and an overall slight decrease in cover quality. Road closures through the 50 years slowly increases the Habitat Effectiveness Index to .59 by the end of the fifth decade

Alternative B-Modified makes a rapid improvement on cover distribution for the first few decades, but reduces the amount of satisfactory cover throughout the 5 decades via greater emphasis on regeneration harvests Cover quality decreases rapidly by the end of the fifth decade as younger stands fail to provide substantial amounts of satisfactory cover. A road closure program mitigates the effect of cover quality reductions, so that by the end of the fifth decade, the Habitat Effectiveness Index has remained at .56

Alternative C-Modified only slowly improves on cover spacing throughout the 5 decades due to emphasis on management for large ponderosa pine and fewer acres assigned to timber management, especially regeneration harvest However, cover quality is maintained and increased, as old growth stands and unharvested older stands remain at higher levels than any other alternative Satisfactory cover is retained at twice the frequency of Alternative B-Modified In Alternative C-Modified, the winter range is managed in mixed conifer providing higher quality cover for elk. By the end of the fifth decade, the Habitat Effectiveness Index for this alternative is 63, although specific winter ranges will have much higher values than average. This effect is masked by application of the Habitat Effectiveness Index model to the entire Forest A road closure program, combined with minimal road construction helps to maintain high overall HEI values.

Alternative F brings a moderate improvement in cover spacing throughout the 5 decades because of additional acres under management Cover quality is reduced by the fifth decade, as regeneration harvests have been delayed due to economic incentives A road closure program helps maintain only a slight increase in habitat conditions over time, as estimated using the HEI model. By the end of the fifth decade, the Habitat Effectiveness Index for this alternative is .59

Alternative I also brings a fairly rapid improvement in cover spacing over the 5 decades, while retaining moderately high levels of satisfactory cover A road closure program limits open road densities such that the overall HEI increases over the 5 decades By the end of the fifth decade, the Habitat Effectiveness Index for Alternative I is .64

Mule deer summer habitat on the Forest would improve with the increase in shrubs and hardwoods in riparian areas expected in all alternatives, except Alternative A Opportunities to enhance browse species like mountain-mahogany, bitterbrush, and forbs for mule deer, would occur under Alternative C-Modified, and to a lesser degree under other alternatives Increased emphasis for uneven-aged management under Alternatives C-Modified and I, would provide the small patches of cover and forage, which could make ideal summer habitat for mule deer

b. *Range Management Effects on Big Game*

Competition for forage appears less important than competition for space on summer range To assess carrying capacity and management needs solely by forage assignment does not appear valid on forested and nonforested ranges grazed concurrently by elk and cattle. Making grazing areas available is more practical and ecologically sound than assignment of forage At this time, forested communities within the Malheur National Forest provide some of the most productive summer habitat for elk in eastern Oregon. Numbers of elk are increasing while permitted cattle use remains fairly constant Cattle use is limited to a 4-month to 4.5-month grazing season during June, July, August, September, and October

Based upon current elk populations and Forest management activity levels, competition for space does not appear to be a limiting factor on summer ranges During the summer use period, permitted cattle favor forage and resting areas on flat to gentle slopes adjacent to water. Cattle use of steeper slopes under existing management levels, permitted season of use, and numbers is light, therefore, these slopes are fully available for big-game use Permitted cattle are moved from pasture-to-pasture as the growing season progresses and as the desired level of utilization is attained Positive livestock control is achieved by maintaining effective unit fences, water developments, and the physical distribution

of use within each grazing unit. Mitigation of any impacts resulting from this use is achieved by alternate annual treatments of use and deferment (rest).

Field studies of competition between elk and livestock provide more evidence of coexistence than of competitive exclusion. Elk preferentially avoid areas with active cattle grazing and/or areas where cattle grazing recently occurred. Biologists have spent considerable time and effort over the past several years gathering data about this topic, but to date it remains largely an issue of conjecture (Lonner and Mackie 1983)

Permitted cattle use on winter range is limited to the same season as that allowed on summer ranges. Winter range is available to elk yearlong, however, concentrated numbers of elk use this range during the winter period depending upon the depth and duration of snow cover and availability of lower-elevation ranges (often not on National Forest land) Cattle are not permitted on winter range during the winter period, therefore, competition for space cannot occur Grazing management attempts to relate cattle stocking rates and big-game use levels to the capability of winter range to produce desired kinds and amounts of vegetation indefinitely. Where conflicts or potential conflicts betweenbig game and cattle occur on forage utilization, the Forest Service may recommend to the State of Oregon a reduction in the population numbers of big game.

Potential conflicts exist between livestock grazing and wildlife habitat needs in that they require the same vegetative component To achieve a predetermined, carefully calculated balance of use between livestock, wild horses, and wildlife, the amount and type of vegetation needed by each must be evaluated Wildlife and livestock may occupy the same land, but due to differences in forage preferences, livestock and wildlife may be using different plants in different locations at different times of the year To resolve conflicts in habitat requirements for all dependent species, the allotment management plan must be adjusted to allow compatible use by each and still maintain health and vigor of the ecosystem. The needs of all wildlife, whether abundant, sensitive, threatened, or endangered, must be identified and met Because habitat is essential for wildlife and livestock, each proposed management practice will be examined to avoid or mitigate possible adverse effects The allotment management plan documents action needed to improve the range and implements the selected alternative. The objective behind each management plan and grazing system is to maintain a vigorous, healthy, and productive plant community for all resources

The majority of harvested acres each year in all alternatives is on flat to gently sloping ground (less than 35 percent slope) Because these areas are favored by livestock and because the alternatives potentially support larger big-game herds, there is increased potential for competition for forage in these areas. However, livestock use is limited on clearcuts for 5 years following harvest, thus increased forage is available to big game Roads constructed for timber harvest activities also help to disperse livestock use to steeper areas previously used only by big game

In alternatives with high permitted livestock levels and/or large potential increases in summer big-game populations, such as Alternatives A and B-Modified, deteriorating range condition could result, especially on winter range.

c. *Mitigation Measures*

In Alternative C-Modified, the previously described effects are partially offset by management of all winter ranges, which includes such practices as forage seeding and burning to enhance vegetation growth In addition, permitted livestock use of degraded riparian areas will be modified or curtailed to allow for recovery of the vegetation in these areas. Increased grazing by big game during winter and/or early spring could slow shrub growth along streams

In other alternatives, range forage condition will be monitored to determine any need for other mitigation measures (see Forest Plan, Chapter V) These would be developed on a

case-by-case basis

As available forage for each alternative increases through timber harvest activities, areas which are not harvested have an increasingly important role in providing both thermal cover (ie., satisfactory and marginal cover) and escapement (ie , hiding cover) for bulls and bucks during hunting seasons. Habitat Effectiveness Index standards will require maintenance of big-game cover within subwatershed areas of 3,000 to 15,000 acres Cover is also located in wilderness and unroaded areas of the Forest as well as in old-growth stands. The unthinned understories of old-growth stands provide big-game hiding cover, and when the crown closure is better than 40 percent old-growth stands provide cover The acres of unroaded areas retained in each alternative are shown in Figure IV-13 The acres of old-growth habitat retained in each alternative are shown in Figure IV-4

In alternatives which intensively manage timber on much of the Forest, such as Alternatives NC, B-Modified and F, dedicated old-growth stands (managed in the case of Alternative NC) will be increasingly important in distribution of cover among the forage provided by timber harvest activities

The medium intensity of timber management in most alternatives (see Section E 2.b in this chapter) creates an assortment of tree age-classes, including older successional stages and openings, which would provide a desirable mixture of cover and forage on a Forest-wide basis Improvements in herbaceous vegetation, especially of hardwoods and shrubs, in riparian areas would also provide hiding cover for mule deer and elk, and quite possibly thermal cover for mule deer The main variation between alternatives is in the number of acres in these areas (See Figure IV-3 and Table IV-2.)

The main thrust of big-game management in coordination with timber management is in implementing Habitat Effectiveness Index standards to achieve desirable balances of cover quality and spacing while providing some security from the potential disturbance of road use Some of the effects of timber management activities can be mitigated Created openings normally will not exceed 40 acres in size, suitable cover stands will be left between openings, harvest units will be considered openings until reproduction reaches 4 5 feet in height, etc Also, big-game habitat improvement projects help mitigate adverse impacts by providing other needed habitat components; the development of water sources, planting of palatable shrubs, browse and forbs, underburning of browse and grassy areas and open timber stands, the removal of barriers to big-game movements, and other strategies.

5 *Effects on Wildlife/Cavity-Dependent Species*

If at least three natural snags per acre were retained on the Forest, that could supply habitat for 100 percent of the potential populations of cavity-dependent species On a managed Forest, however, snags and potential snags are harvested for timber, wood fiber, or firewood Some are removed for the safety of woods-workers or recreationists As demand for timber increases, especially wood fiber and firewood, managing snags will require more effort The main variation between alternatives is in the percent of total potential populations of cavity-dependent species for which snags are managed.

Outside the wilderness and unroaded areas, snag levels are provided in specific management areas of the Forest Each alternative provides habitat to carry 80 percent of potential cavity nesting species populations in riparian areas, and 50 percent with 600 feet of riparian areas, except for Alternatives A, NC, and I. All alternatives would provide snags at or near natural levels in wildernesses, Research Natural Areas, scenic areas, bald eagle winter roosts, and dedicated old-growth areas Alternatives A and NC provide a 60 percent snag level in wildlife emphasis areas and 40 percent on the rest of the Forest. Old-growth habitat contributes to these snag habitat levels Alternative I provides for 40 percent of the potential cavity dwelling species Forest-wide, 60 percent of the potential in riparian areas, and 60-100 percent in wildlife emphasis areas

Alternative B-Modified provides for a Forest-wide average of at least 40 percent of potential cavity-nesting populations Alternative F also provides for a Forest-wide average of about 40 percent of the potential cavity-nesting population Alternative C-Modified provides for a Forest-wide average of 60 percent of the cavity-nesting population A 20 percent level of potential populations is considered the lowest level which could provide for viable populations However, due to regional Forest Service requirements, all viable alternatives have been designed to exceed this minimum level

In Alternative B-Modified, the majority of unroaded areas will be developed within the first decade and roads will provide access for woodcutters to these areas, further increasing the risk to snag levels there The role of snags in riparian areas in Alternative B-Modified then is critical to maintaining these populations at viable levels Excessive loss of those trees to woodcutting, salvage sales, or natural catastrophes could reduce cavity-dependent populations below the minimum level

Alternatives A, F, and I will develop much of the available unroaded areas in the first decade, but snag levels will not be reduced as severely as in Alternative B-Modified Access management design would limit the amount of open road miles, thus mediating snag removals Alternative C-Modified provides for the highest level of snags of any alternative

Mitigation Measures

Mitigation measures for snag management will include protection of existing snags and creation of snags by natural or artificial means in snag-deficient areas Protection measures available are (1) leaving snag numbers at higher levels than required to maintain minimum populations of cavity-dependent species, (2) public education, (3) marking of snags for protection, (4) changes in firewood cutting policy, (5) area closures to firewood cutting, and (6) leaving live trees as future winter roosts, and dedicated old-growth areas

Based on experience, protection of snags during commercial timber harvest and prescribed fire is expected to be about 80 percent effective This includes designating live trees to provide future snags, as well as identifying existing snags for protection As timber harvest prescriptions change toward an emphasis on regeneration in later decades, the designation of live trees to provide future snags will become more important Creating snags in snag-deficient areas can be over 90 percent effective where suitable trees are available (Umpqua NF, Diamond Lake RD, 1983 Project Report)

Loss of snags due to firewood cutting is less easily controlled, however, due to the easy availability of dead lodgepole pine, this has not yet become a general concern across the Forest By the end of the first decade, most dead lodgepole pine will have been harvested. By that time, changes in fuelwood cutting policy or restrictions on wood gathering may be needed in specific areas to maintain snag numbers at desired management levels Because of easy access to most of the Forest, administration and enforcement of such restrictions may be a challenge for Forest administrators Effectiveness of these measures will depend on policy changes, the success of public education, and the level of administration

6 *Effects on Wildlife/Old-Growth Indicator Species*

The acres of old growth provided in each alternative are shown in Figure IV-4 Old growth is provided in designated old-growth units distributed across the Forest and within wilderness, roadless areas, and the bald eagle winter roost areas All alternatives maintain 35,239 acres of old-growth in wilderness (37,697 acres in Alternative C-Modified) and 3,350 acres in the bald eagle winter roost areas The amount of old-growth in roadless areas and designated old-growth units varies by alternative Alternative B-Modified maintains the least in roadless areas, with 8,486 acres Alternatives A, F, I and C-Modified have increasing amounts, with Alternative C-Modified having 89,950 acres, corresponding to 50% above Management Requirement levels Alternatives A and B-Modified retain sufficient old growth distributed across the Forest to provide for viable populations of old-growth indicator species (this is the Management Requirement level,

see Appendix G of this FEIS for Management Requirements) Alternatives F and I provide 30 percent above the Management Requirement level. These units are outside of unroaded areas and wildernesses. Based on available information, Alternative NC will provide old growth on suitable forest lands Old growth will be provided on approximately 8 percent of the Forest or 10 percent of the forested acres, with some variances between alternatives.

Natural events, such as the recent mountain pine beetle epidemic which virtually eliminated mature and old-growth lodgepole pine from this Forest, can have a significant effect on the availability of viable old-growth stands. Young lodgepole pine stands will eventually grow into the later seral stages which conform to old-growth and will once again provide this habitat Species which prefer such habitat will have less than optimal conditions for the next 30 years and their populations may decline Remnant populations of these species will probably be maintained under the assumptions. (1) some unaffected amount of old-growth lodgepole pine is available and providing minimum habitat needs to support the breeding population, and/or (2) these species are adaptable to other habitat types for some of these minimal needs No alternative in this Final Environmental Impact Statement provides minimum levels of old-growth lodgepole pine habitat, since this habitat is almost non-existent All alternatives would incorporate a management standard to identify any existing and potential old-growth lodgepole pine stands as per Regional Management Requirements

Natural and escaped fires are also a threat to old-growth If fires eliminated habitat in the fifth decade or later, it would take several decades to replace that lost habitat

Thus, Alternative B-Modified, which has the least old-growth in unroaded areas and designates a Management Requirement level of old-growth outside of unroaded and wildernesses, has the least buffer for maintaining viable populations of old-growth indicator species after a major natural or human-caused event resulting in the loss of old-growth stands.

Mitigation Measures

Old-growth retention above the Management Requirement level is the basic form of mitigation. Also, low-intensity timber management in visually sensitive areaswill maintain stands with some large trees, in riparian areas snag levels are to be maintained at higher levels than on upland forested areas. Therefore, where these areas overlap, the combination of scattered old-growth trees and a higher number of snags will provide some features of old-growth.

Research is ongoing to better define the Management Requirement (MR) levels for old-growth Some reasons for maintaining old-growth levels above the Management Requirement levels are: (1) risk associated with managing at minimum viable population levels, (2) maintain future options for adjustments when better information on old-growth habitat requirements is available, (3) not all of the old-growth units may have 100 percent occupancy, as is the planning assumption, and (4) until all the dedicated units have been field surveyed, there is not the complete assurance that units selected will meet all of the old-growth habitat requirements A discussion of the research used as the basis for the Management Requirement direction is included in Appendix G

The assumption is, based on professional judgment, that unaltered and stable ecosystems such as designated old-growth areas, with little human use, will be 100 percent effective in providing old-growth habitat needs. Monitoring is planned if changes are observed in old-growth condition and mitigation measures will be applied A possible effect on old-growth areas will be the reduction in snags and down woody material due to firewood cutting Administration of the firewood cutting policy will lessen the potential impact of snag and down woody material removal Mitigation measures such as this are generally very effective.